

Three new species of *Fontainea* Heckel (Euphorbiaceae) from Australia and Papua New Guinea

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Summary

Forster, Paul I. (1997). Three new species of *Fontainea* Heckel (Euphorbiaceae) from Australia and Papua New Guinea. *Austrobaileya* 5(1): 29–37. *Fontainea fugax* P.I.Forst. from Queensland, Australia, and *F. borealis* P.I.Forst. and *F. subpapuana* P.I.Forst. from Papua New Guinea are named as new species. Information is provided on their distribution, habitat and affinities. Separate identification keys are provided for *Fontainea* in New Guinea and Australia.

Keywords: Euphorbiaceae, *Fontainea*, *Fontainea borealis*, *Fontainea fugax*, *Fontainea subpapuana*, Papua New Guinea, Queensland.

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Introduction

The genus *Fontainea* Heckel is classified in Euphorbiaceae, subfamily Crotonoideae, tribe Codiaeae (Webster 1994) and comprises shrubs or small trees that grow in rainforest communities. Jessup & Guymmer (1985) revised *Fontainea* and recognised six species for Australia and New Caledonia, as well as mentioning additional unnamed taxa from Papua New Guinea and New Caledonia.

Airy Shaw (1974, 1980) referred the collections of *Fontainea* from Papua New Guinea to *F. pancheri* (Baillon) Heckel based on their similarity to the type of this species from New Caledonia. Jessup & Guymmer (1985) thought this identification unlikely, but did not resolve the identity of the species in Papua New Guinea due to the incomplete nature of the available specimens.

In preparing accounts of *Fontainea*, both for 'Flora of Australia' and 'Flora Malesiana', it is now necessary to determine the status of the *Fontainea* collections from Papua New Guinea. Although no further collections have been made in the decade since Jessup & Guymmer's account, the available collections do enable diagnostic characters to be determined, as well as preparation of descriptions and discussion of affinities. There are two species

of *Fontainea* present in Papua New Guinea, one from the north-east and one from the south-east parts of the country. These are named as *F. borealis* and *F. subpapuana* respectively. An additional species of *Fontainea* from south-east Queensland, Australia has also been discovered in the last decade, and is named *F. fugax*.

Taxonomy

1. *Fontainea borealis* P.I.Forst., sp. nov. affinis *F. picrospermae* C.T. White a qua lamina folii prope basem eglandulosa, calyce 4-lobato lobatis ovatis, petalis obovatis usque lanceolatiovatis, floribus maribus disco c. 0.6 mm alto lobato irregulariter, et staminibus connatis 1–1.5 mm super discum differt. **Typus:** Papua New Guinea. EASTERN HIGHLANDS PROVINCE: Aiyura, Oct 1944, L.S. Smith NGF1030 (holo: K; iso: BRI; L n.v.).

Shrub or small tree to 12 m high; stem exudate colour unknown. New shoots with dense, antrorse golden trichomes. Stipules absent. Leaves petiolate, discolorous; petioles 10–26 mm long, 1–1.4 mm diameter, swollen at base and apex, narrowly channelled above, glabrous; lamina elliptic to oblanceolate, 56–240 mm long, 22–70 mm wide, not decurrent, chartaceous; upper surface dark green; lower surface pale green; venation comprising 8–14 lateral veins per side of midrib and reticulate interlateral veins; tip acute to

acuminate; base cuneate; glands absent from base of lamina. Male inflorescences terminal or axillary, with sparse trichomes. Male flowers 5–7 mm long, 7–8 mm diameter; pedicels 2.5–5 mm long, c. 1 mm wide, with scattered trichomes; calyx 4-lobed, 2.8–3.5 mm long, lobes ovate; petals 5, lanceolate-ovate to obovate, 5–6 mm long, 2–3.5 mm wide, weakly recurved, externally and internally with dense velutinous trichomes; disk undulate with grooves, c. 0.6 mm long and 2.5 mm diameter, glabrous; stamens 24–28, connate 1–1.5 mm above top of disk, filaments free for 2–2.5 mm,

glabrous towards top, densely hairy at base; anthers c. 0.8 mm long and 0.5 mm wide. Female flowers not seen. Fruit not seen. Fig. 1.

Additional specimens examined: Papua New Guinea. EASTERN HIGHLANDS PROVINCE: Numura, an Strasse Kainantu - Goroka, 0.5 mile nach Abzweigung nach Okapa, 6 mile von Kainantu, Jan 1964, *Stauffer 5608 & Sayers* (K; L *n.v.*).

Distribution and habitat: *Fontainea borealis* is known only from the Eastern Highlands Province of Papua New Guinea. Plants have been recorded from rainforest at altitudes of 1800–2000 m.

Notes: The available herbarium material of *F. borealis* is incomplete thus preventing a detailed description. *F. borealis* appears to be allied to the Australian *F. picrosperma* C.T.White and a comparison of these two taxa is made in Table 1.

Table 1. Morphological comparison of *Fontainea picrosperma* and *F. borealis*.

Character	<i>F. picrosperma</i>	<i>F. borealis</i>
glands in leaf lamina	present	absent
disk	undulate to lobed 0.7–1 mm high	irregularly lobed c. 0.6 mm high
male calyx	2–3-lobed	4-lobed
male calyx lobes	triangular-ovate to	ovate broadly ovate
male petals	oblong-ovate	obovate to lanceolate-ovate
stamens connate	c. 0.5 mm	1–1.5 mm

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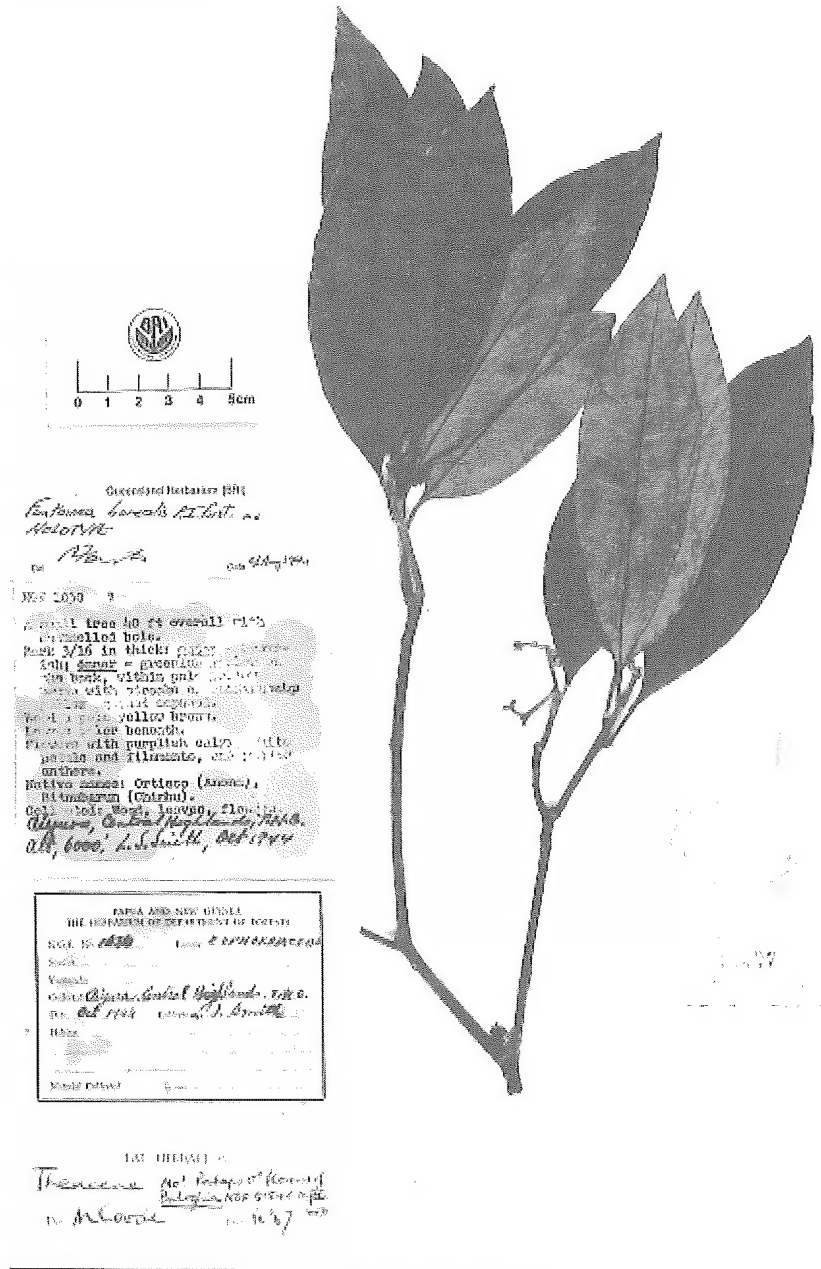


Fig. 1. *Fontainea borealis* P.I. Forst. Photograph of holotype at K.

Conservation status: Unknown.

Etymology: The specific epithet is derived from Latin *borealis* (northern) and refers to the northerly distribution of this species within the genus.

- 2. *Fontainea subpapuana*** P.I.Forst., **sp. nov.**
 affinis *F. picrospermae* C.T.White
 a qua petiolo tumido ad apicem
 tantum, lamina folii venis primariis
 utroque costate 13–15, calyce florum
 marium 4–5-lobato, stylis longioribus
 (3–3.5 mm longis), et endocarpo paginis
 intersuturalibus latioribus (12–13 mm
 latis) differt. **Typus:** Papua New Guinea.
 CENTRAL PROVINCE: Kuriva Forestry area,
 near Weimauri River, 9°05'S, 147°05'E,
 6 May 1971, *H.Streimann & A.Kairo*
 LAE51548 (holo: K; iso: BRI, K; *L.n.v.*).

Tree to 7 m high; stems with red exudate. New shoots with dense, antrorse yellow trichomes. Stipules absent. Leaves petiolate, discolorous; petioles 12–20 mm long, 1–1.4 mm diameter, swollen at top and narrowly channelled above, with scattered trichomes; lamina elliptic to oblanceolate, rarely obovate, 60–170 mm long, 30–60 mm wide, not decurrent, chartaceous; upper surface dark green; lower surface pale green; venation comprising 13–15 lateral veins and reticulate

interlateral veins; tip acuminate; base cuneate to weakly attenuate; glands elliptic, sessile, 1–2 mm long, ± marginal, 0.5–1 mm from base of lamina. Male inflorescences not seen. Male flowers not seen. Female inflorescence terminal, comprising 1–3 flowers. Female flowers 5–8 mm long, 10–13 mm diameter; pedicels 7–15 mm long, 1–1.2 mm diameter, with sparse trichomes; calyx 4–5-lobed, 2–2.5 mm long, lobes rounded-ovate, with sparse trichomes; petals 5, lanceolate-ovate, 6–8 mm long, 2.5–3 mm wide, ± recurved, with dense velutinous trichomes externally and internally; disk not dissected; ovary 3–4-locular, ovoid, with dense antrorse trichomes; styles 3–3.5 mm long. Intact fruit not seen. Sarcocarp red (*n.v.*). Endocarp very shortly beaked, 3-ridged at sutures; intersutural faces smooth, convex, 25–26 mm long, 12–13 mm wide. Fig. 2.

Distribution and habitat: *Fontainea subpapuana* is known only from Central Province in south-east Papua New Guinea. Plants were recorded as growing in lowland rainforest on river flats.

Notes: *Fontainea subpapuana* is very poorly known and the above description lacks significant details with regard to the male flowers and mature fruit. This species is closely allied to the Australian *F. picrosperma*. *Fontainea subpapuana* and *F. picrosperma* are compared in Table 2. *Fontainea subpapuana* and *F. borealis* may be distinguished with the following key.

1. Leaf petioles swollen at base and apex; glands absent from lamina **F. borealis**
 Leaf petioles swollen only at apex; glands present in lamina and ± marginal near base **F. subpapuana**

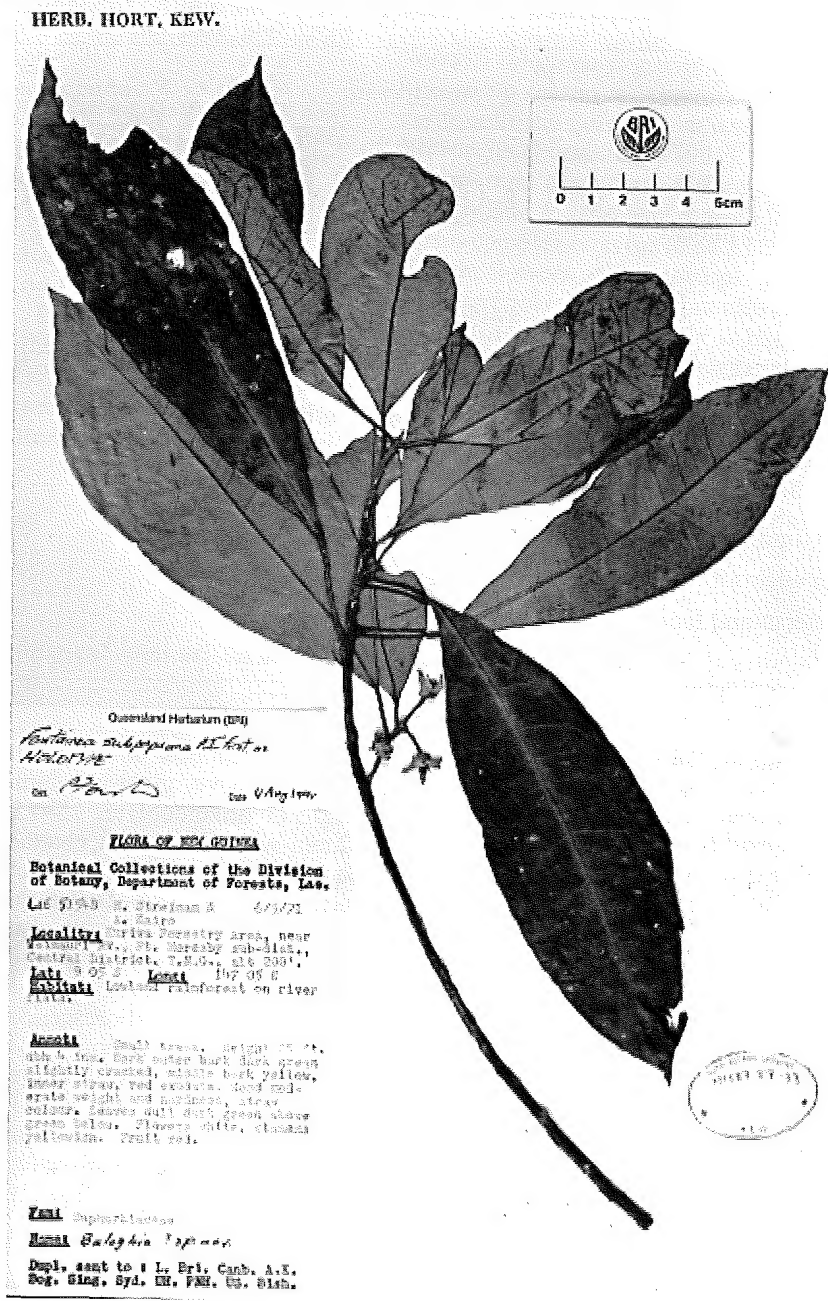


Fig. 2. *Fontainea subpapuana* P.I. Forst. Photograph of holotype at K.

Table 2. Morphological comparison of *Fontainea picrosperma* and *F. subpapuana*.

Character	<i>F. picrosperma</i>	<i>F. subpapuana</i>
No. lateral veins per side of leaf lamina midrib	8–12	13–15
Petiole base	swollen	not swollen
Petiole apex	swollen	swollen
male flower calyx	2–3-lobed	4–5-lobed
style length (mm)	0.8–2	3–3.5
endocarp intersutural face width (mm)	7–10	12–13

Conservation status: Unknown.

Etymology: The specific epithet is derived from Latin *sub-* (below) and *papuana* (of Papua), and refers to the distribution of this species on the south coast of Papua New Guinea.

3. *Fontainea fugax* P.I.Forst., sp. nov. affinis *F. rostratae* Jessup & Guymer a qua petiolo ad basem tumido, floribus maribus minoribus (4–5 × 6–8 mm) et staminibus paucioribus (24), endocarpo rostro brevior (1–1.7 mm longo) et paginis intersuturalibus leniter rugosis plus minusve planis usque leniter convexis et perminore (15–17 × 8–9.5 mm) differt. **Typus:** Queensland. BURNETT DISTRICT: Fontainea Scrub, State Forest 172, Gurgeena Plateau, 9 Feb 1994, *P.I. Forster* 14802 (holo: BRI [1 sheet + spirit, male plant])

Shrub to 4 m high; stems with clear exudate. New shoots with sparse, antrorse uncoloured trichomes. Stipules absent. Leaves petiolate, discolorous; petioles 2–4 mm long, c. 1 mm

diameter, of uniform thickness and narrowly channelled above, glabrous; lamina elliptic, obovate or oblanceolate, 15–75 mm long, 6–42 mm wide, ± decurrent, chartaceous; upper surface dark green; lower surface pale green; venation comprising 6–10 lateral veins and reticulate interlateral veins; tip acute to obtuse; base cuneate; glands elliptic, sessile, 1–2 mm long, markedly intramarginal, 2–8 mm from base of lamina. Male inflorescence terminal or axillary, with sparse trichomes. Male flowers 4–5 mm long, 6–8 mm diameter; pedicels 2.5–5 mm long, 0.5–1 mm wide, with sparse trichomes; calyx 4-lobed, 2–2.5 mm long, lobes ovate; petals 4, lanceolate-ovate, 4.5–5 mm long, 2–2.5 mm wide, strongly recurved, externally with sparse trichomes, internally with sparse trichomes apart from near base where they are dense and velutinous; disk irregularly crenate, 0.4–0.8 mm long, 2–3 mm diameter, glabrous; stamens 24, connate up to 1.5 mm above top of disk, filaments free for 1–3 mm, glabrous towards top, densely hairy at base; anthers 0.6–0.8 mm long, 0.4–0.5 mm wide. Female flowers not seen. Intact fruit not seen. Sarcocarp with sparse trichomes. Endocarp

beaked for 1–1.7 mm at tip, 3–4-ridged at sutures; intersutural faces weakly rugose, ± flat to slightly convex, 15–17 mm long, 8–9.5 mm wide. Fig. 3.

Additional specimens examined: Queensland. BURNETT DISTRICT: Portion 90, S.F. 172 [now a Conservation Park], Aug 1988, *Forster* 4687 (BRI); Fontainea Scrub, S.F. 172, Oct 1993, *Forster* 14130 (BRI); ditto, May 1996, *Forster* 19158 (BRI).

Distribution and habitat: *Fontainea fugax* is known only from the Binjour–Gurgeena Plateau area between Gayndah and Mundubbera in the Burnett district of south-east Queensland. Plants grow as understorey shrubs in semi-evergreen vine thicket with a canopy dominated by *Backhousia kingii*

Guymer on red eucrozem soils at altitudes between 350 and 400 m.

Notes: *Fontainea fugax* is closely allied to *F. rostrata* Jessup & Guymer and the initial sterile collection of the plant was referred to as this species (Forster et al. 1991). A comparison of important diagnostic differences between *F. fugax* and *F. rostrata* is provided in Table 3. This comparison is based on limited material of male flowers and endocarps, yet provides clear morphological discontinuities between the two entities. Unfortunately it has not been possible to obtain herbarium material of female flowers and mature fruits, this is despite repeated visits (c. 10) between 1994 and mid 1996 after rainfall events when flowering could be expected. This situation could persist indefinitely and due to the rarity of this plant it is considered more beneficial for its conservation if the species is formally named.

Table 3. Morphological comparison of *Fontainea fugax* and *F. rostrata*.

Character	<i>F. fugax</i>	<i>F. rostrata</i>
petiole	base not swollen	base slightly swollen
male flowers	4–5 × 6–8 mm	4–6 × 11–13 mm
stamen no.	24	28–40
endocarp beak	1–1.7 mm long	2–3 mm long
intersutural faces	weakly rugose ± flat to concave 15–17 × 8–9.5 mm	strongly rugose ± flat to weakly convex 20–23 × 11–13 mm

Conservation status: *Fontainea fugax* is known from only two populations in close proximity to one another. One population (apparently of one plant) is present in a Conservation Park (site 50 of Forster et al. 1991). The other population (with less than 50 plants) is present in State Forest within a very small stand of vine thicket that is experiencing repeated fire incursions on its western boundary and weed infestations of

Mexican daisy – *Verbesina encelioides* (Cav.) Benth. & Hook.f. ex A.Gray and Dutchmans Pipe – *Aristolochia elegans* Mast., on the eastern boundary associated with fence construction by the leaseholder. Virtually all semi-evergreen vine thicket on the Binjour–Gurgeena Plateau that is not in conservation Park or State Forest, has now been cleared for agriculture and grazing. This area is notable for other endangered or geographically significant plant

species that occur in the semi-evergreen vine thicket communities, especially *Pomaderris clivicola* E.M.Ross, *Bertya opponens* (F.Muell. ex Benth.) Guymer, *B. pedicellata* F.Muell. and *Zieria* sp. (Binjour Plateau P.I.Forster

14134). Both *F. fugax* and the community in which it occurs, are endangered in the central Burnett district. A conservation coding of E (endangered) is recommended for listing under the *Queensland Nature Conservation Act 1992*.

Etymology: The specific epithet is derived from Latin *fugax* (fleeting, transitory) and alludes to the difficulty of obtaining material of the flowers of this species.

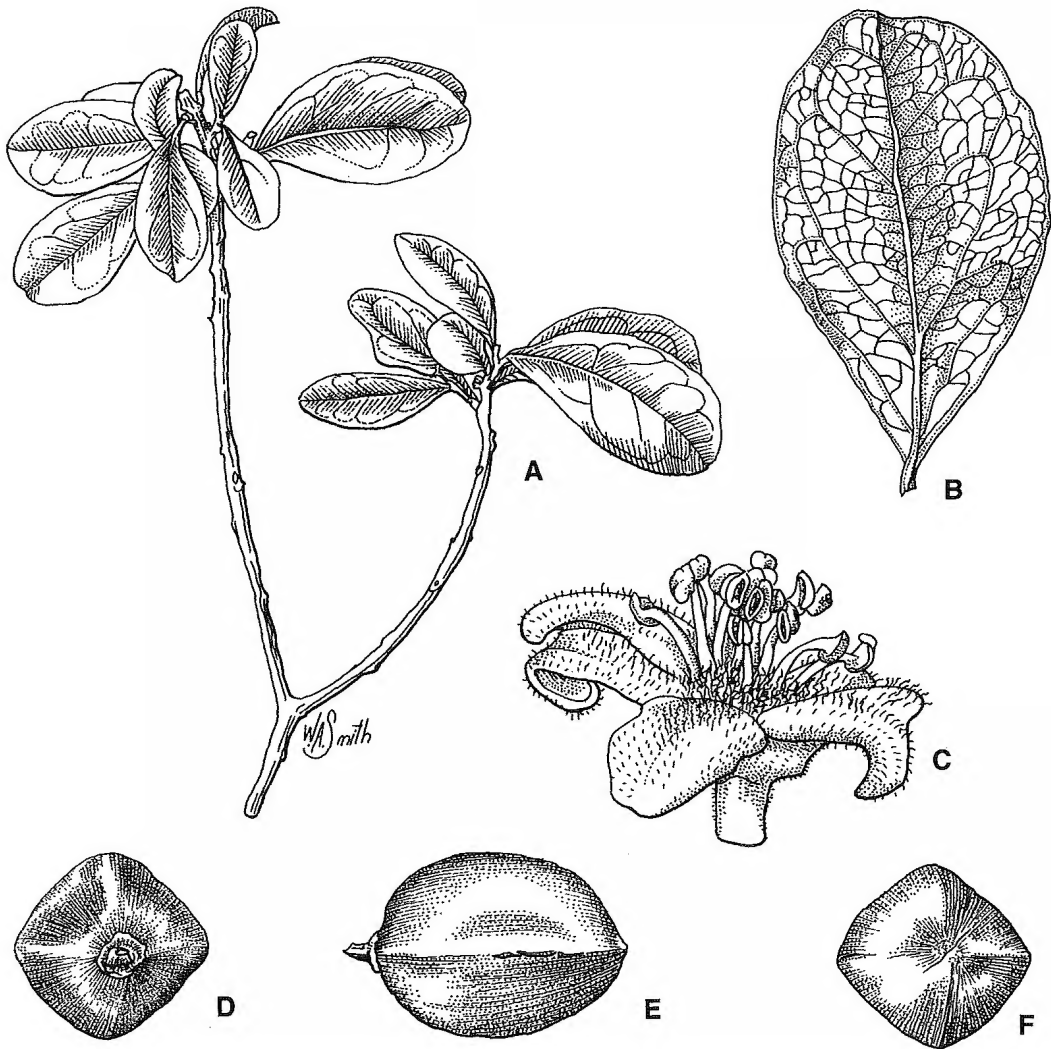


Fig. 3. *Fontainea fugax* P.I.Forster. A. twig $\times 0.8$. B. undersurface of leaf showing venation $\times 1.5$. C. male flower $\times 6$. D–F. views of endocarps $\times 2$. A–C Forster 14802 (BRI), D–F Forster 14130 (BRI). Del. W.Smith.

Key to the Australian taxa of *Fontainea*

1. Leaf petioles slightly swollen at base and apex; male flower disk with dense trichomes 2
 Leaf petioles of uniform thickness or slightly swollen only at base; male flower disk glabrous 4
2. Leaf petioles not geniculate; basilaminar glands marginal; fruit endocarp beaked **F. picrosperma**
 Leaf petioles \pm geniculate; basilaminar glands intramarginal to submarginal; fruit endocarp not beaked 3
3. Fruit broadly ovoid, 27–27 mm long; endocarp intersutural faces smooth **F. australis**
 Fruit globose to depressed-globose, 18–22 mm long; endocarp intersutural faces rugose **F. oraria**
4. Leaf basilaminar glands marginal, at junction of petiole and lamina; endocarp not beaked, intersutural faces smooth with scattered vascular foramina **F. venosa**
 Leaf basilaminar glands intramarginal to submarginal, 2–22 mm from lamina base; endocarp beaked for 1–3 mm, intersutural faces rugose 5
5. Leaf petioles of uniform thickness; fruit endocarp beaked for 1–1.7 mm; endocarp intersutural faces weakly rugose, 15–17 mm long, 8–9.5 mm wide **F. fugax**
 Leaf petioles slightly swollen at base; fruit endocarp beaked for 2–3 mm; endocarp intersutural faces strongly rugose, 20–23 mm long, 11–13 mm wide **F. rostrata**

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